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Emotional regulation and psychological well-being in operational firefighters

Regulación emocional y bienestar psicológico en bomberos operativos

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ABSTRACT


Introduction: operational firefighters are personnel trained to face emergencies; therefore, it is necessary to maintain emotional regulation, adaptive and problem-solving skills that favor the mastery of their work activities. The objective of this research was to determine the relationship between emotional regulation and psychological well-being in operational firefighters of the Ambato Fire Department, Ecuador. Methodology: quantitative, descriptive, comparative, correlational and cross-sectional design, working with a sample of 150 firefighters. Emotional regulation was assessed with the Emotional Regulation Questionnaire (ERQ) and psychological well-being with the Ryff Psychological Well-Being Scale. Results: women presented higher levels in both variables. In emotional regulation, 67.9 % of women were at the medium level, compared to 55.7 % of men at the low level. Regarding psychological well-being, 75 % of women showed high levels, in contrast to 63.9 % of men. In addition, a significant positive correlation was observed ($r = 0.488$, $p < 0.001$), suggesting that better emotional regulation favors psychological well-being. Gender differences in emotional regulation strategies were also identified: women prefer cognitive reappraisal, whereas men tend to emotional suppression. Conclusions: These findings highlight the importance of fostering emotional regulation skills to improve the mental health of firefighters and open the door to future research on gender differences in this area.

Keywords: emotional regulation, psychological well-being, operational firefighters, positive psychology, coping

RESUMEN

Introducción: los bomberos operativos son personal capacitado para afrontar emergencias por lo que es necesario mantener regulación emocional, habilidades adaptativas y solución de problemas que favorezcan el dominio de sus actividades laborales. El objetivo de esta investigación fue determinar la relación entre la regulación emocional y el bienestar psicológico en bomberos operativos del Cuerpo de Bomberos de Ambato, Ecuador. Metodología: diseño cuantitativo, descriptivo, comparativo, correlacional y transversal, se trabajó con una muestra de 150 bomberos. La regulación emocional se evaluó mediante el Emotional Regulation Questionnaire (ERQ) y el bienestar psicológico con la Escala de Bienestar Psicológico de Ryff. Resultados: las mujeres presentan mejores niveles en ambas variables. En regulación emocional, el 67,9 % de las mujeres se ubicaron en el nivel medio, frente al 55,7 % de los hombres en el nivel bajo. Respecto al bienestar psicológico, el 75 % de las mujeres mostró niveles altos, en contraste con el 63,9 % de los hombres. Además, se observó una correlación positiva significativa ($r = 0,488$, $p < 0,001$), sugiriendo que una mejor regulación emocional favorece el bienestar psicológico. También se identificaron diferencias de género en las estrategias de regulación emocional: las mujeres prefieren la reevaluación cognitiva, mientras que los hombres tienden a la supresión emocional. Conclusiones: estos hallazgos resaltan la importancia de fomentar habilidades de regulación emocional para mejorar la salud mental de los bomberos y abren la puerta a futuras investigaciones sobre las diferencias de género en este ámbito.

Palabras clave: regulación emocional, bienestar psicológico, bomberos operativos, psicología positiva, afrontamiento

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INTRODUCCIÓN

Emotional regulation and psychological well-being in operational firefighters represent a priority area of research, given the relevance of their profession in contexts of emergency and extreme risk. This problem can be defined as the interaction between intense work demands and the psychological resources available to manage these demands, which has a direct impact on the quality of life of these professionals. According to the (Organización Mundial de la Salud, 2022), mental health is an essential component of general well-being, especially in high-risk occupations. The WHO emphasizes that firefighters face constant exposure to traumatic situations that can lead to psychological disorders such as Post-Traumatic Stress Disorder (PTSD) and depression (Rosas, Perren Klingler, Ferro, & Fernández, 2020).

According to Skeffington et al. (2016), between 16 % and 22 % of firefighters have been diagnosed with PTSD, a significantly higher prevalence than in the general population. In addition, it is estimated that between 20 % and 35 % of firefighters experience symptoms of anxiety, depression and trauma (Silva Marconato & Monteiro, 2020). These data highlight the need to address the psychological well-being of this population, through interventions that promote effective emotional regulation strategies.

Emotional regulation (ER) can be defined as the ability to manage and modify emotions according to the demands of the environment (Gross, 1998). This skill is classified into strategies such as cognitive reappraisal (CR) and emotional suppression (SE). While CR is associated with decreased emotional distress and an increase in feelings of psychological well-being (Webb, Miles, & Sheeran, 2012), SE has been linked to increased internal distress and difficulties in interpersonal relationships. In the case of firefighters, the predominant use of adaptive strategies such as CR is essential to manage negative emotions derived from their daily work (Cano-Gallent et al., 2023; Díaz & Rodríguez-Carvajal, 2006).

Psychological well-being (BP), defined by Ryff (1989) as a multidimensional construct, includes dimensions such as self-acceptance, positive relationships, purpose in life, autonomy, mastery of the environment, and personal growth. This eudaimonic approach emphasizes that well-being is not a transitory state, but a continuous process of personal development. In the field of firefighters, self-acceptance and purpose in life stand out as critical dimensions in facing the psychological demands inherent in their profession (Dunn & Norton, 2022).

Previous studies have explored the relationship between ER and BP in extreme work contexts. For example, Rivas (2022) found that 31.7 % of firefighters in North Lima had high levels of BP, closely related to adaptive strategies such as cognitive reappraisal and problem solving. Similarly, García Quiroga et al. (2020) reported that, in San Luis, Argentina, social support and problem-solving were positively correlated with BP, while fatalistic approaches had a negative impact. These findings underscore the importance of fostering effective support

networks and daily resilient coping strategies (Cano-Gallent et al., 2023; Díaz & Rodríguez-Carvajal, 2006).

Group cohesion and social support are key protective factors that contribute to stress mitigation in firefighters. According to Martínez Priego et al. (2024), positive work relationships strengthen emotional regulation and individual resilience, especially in highly demanding contexts. These interactions not only improve operational dynamics, but also act as a buffer against psychological disorders such as anxiety and depression. In addition, social support within the team facilitates effective communication and the equitable distribution of responsibilities, increasing the sense of security and control (Intriago-Intriago & Saldarriaga-Villamil, 2021).

The absence of adaptive coping strategies and low levels of emotional regulation increase vulnerability to psychological disorders such as PTSD and anxiety. Carbone (2023) and Pascual Jimeno & Cornejo López (2019) highlight the need to design training programs in emotional regulation and resilient skills that can prevent future complications and improve overall well-being. These programs should include components such as high-fidelity simulations, emotional intelligence training, and coping strategies, tailored to the specific needs of firefighters (Gagné & Deci, 2005).

The absence of adaptive coping strategies and low levels of emotional regulation increase vulnerability to psychological disorders such as PTSD and anxiety. Carbone (2023) and Pascual Jimeno & Cornejo López (2019) highlight the need to design training programs in emotional regulation and resilient skills that can prevent future complications and improve overall well-being. These programs should include components such as high-fidelity simulations, emotional intelligence training, and coping strategies, tailored to the specific needs of firefighters (Acuña Conejero, Aguado Marqués, Álvarez Casado, & Amores Tola, 2021).

Along these lines, the implementation of organizational measures that promote the balance between work demands and personal needs, such as flexible schedules and access to operational psychological services (Pascual Jimeno & Cornejo López, 2019), could contribute significantly to improving overall well-being.

It is here that the psychological well-being of firefighters not only depends on their individual ability to manage emotions, but also on the organizational context and the support policies implemented. The incorporation of comprehensive interventions that combine prevention, early intervention and continuous follow-up could optimize both mental health and professional performance, promoting a sustainable balance between work demands and personal well-being. This underscores the importance of developing a holistic, evidence-based approach to addressing the psychological challenges of operational firefighters (Acuña Conejero, Aguado Marqués, Álvarez Casado, & Amores Tola, 2021).

These stressors can generate significant emotional exhaustion, affecting your ability to manage emotions in an effective and demanding way (Martínez Priego, García Noblejas, & Roca,

2024). By exploring this relationship, we aim to identify how emotional regulation strategies, such as cognitive reappraisal or emotional suppression, can influence the psychological well-being of firefighters, helping to prevent or mitigate the negative impact of work-related stress. Therefore, the present research seeks to determine the relationship between emotional regulation and psychological well-being in operational firefighters, considering that this population is constantly exposed to situations of high emotional load and stress, which can affect their psychological and emotional state.

MATERIALS AND METHODS

The present research was developed under a quantitative approach, with a non-experimental design and a correlational-comparative scope, using a cross-section.

For data collection, previously validated instruments were used that were applied by the Human Talent Department of the institution, through the Medical Center and the Clinical Psychology Area of the Fire Department. The researcher accessed the results obtained through formal authorization, ensuring compliance with ethical principles. In addition, clinical records were reviewed to complement data collection, ensuring the anonymity and methodological integrity of the study.

The population was made up of 215 operational firefighters from the Fire Department of the city of Ambato, province of Tungurahua, Ecuador. However, the final sample included 150 firefighters selected using strict inclusion and exclusion criteria. The inclusion criteria were: active performance in operational functions and having a minimum of one year of continuous service. Those in administrative roles, on medical leave, did not complete the instruments adequately, or had previous clinical diagnoses of psychological disorders such as depression, anxiety, or PTSD were excluded.

Of the participants, 81.3 % were men and 18.7 % women. The mean age was 28.4 years, with a standard deviation of 4.76 years. The majority age range was 26 to 35 years old (68 %), followed by the 18 to 25 year old group (28 %) and 4 % in the 36 to 46 year old range. In terms of marital status, 68 % were single, 27.3% were married, 2.7 % were in a common-law union and 2 % were divorced. Regarding the educational level, 78.7 % had higher education and 19.3 % had high school studies.

To assess emotional regulation, the Emotional Regulation Questionnaire (ERQ) by Gross (2003), adapted by Pagano and Vizioli (2021) for the Chilean adult population, was used. This instrument measures cognitive reappraisal and emotional suppression strategies using 9 items assessed on a Likert scale from 1 to 7. The items are grouped into two dimensions: cognitive reappraisal (1, 3, 5, 7, 8, 10) and emotional suppression (2, 6, 9). The overall scores are classified into high, medium and low levels, and the dimensions have adequate reliability indices, with alpha ordinals of 0.87 and 0.71 respectively.

For psychological well-being, the adapted version of the Psychological Well-being Scale (BPS) of Ryff (1989), validated by Díaz et al. (2006), was used. This scale consists of 29 items distributed in six dimensions: self-acceptance, positive relationships, autonomy, mastery of the environment, purpose in life and personal growth. The scores are measured on a Likert scale from 1 to 6, and their Cronbach's alpha is 0.84, which ensures high internal consistency. The general and dimensional scores allow us to identify high, medium and low levels of well-being.

The data collected were processed using the Statistical Package for the Social Sciences (SPSS) version 30.0. Descriptive analyses were performed to characterize the variables and inferential analyses were performed to explore relationships between emotional regulation and psychological well-being. Specifically, the Spearman Rho correlation test, the exact Fisher-Freeman-Halton test and the Mann-Whitney U test were used to compare groups.

The systematic and rigorous analysis of the data helped to ensure the validity of the results, providing a comprehensive understanding of the interactions between the variables in the specific context of operational firefighters. In addition, the confidentiality and anonymity of the information was ensured, complying with international ethical standards.

RESULTS AND DISCUSSION

Table 1

Levels of emotional regulation

Emotional regulation			
Levels of emotional regulation		N	%
Female	Low level	9	32.1
	Medium level	19	67.9
Male	Low level	68	55.7
	Medium level	54	44.3

67.9 % of the women reported a medium level of emotional regulation, while 32.1 % were at a low level. In men, 55.7 % had a low level. The results indicate that, in the sample analyzed, women have greater emotional regulation, while men show greater difficulties, with a higher percentage at the low level.

Table 2

Levels of psychological well-being

Psychological Well-Being			
Levels of psychological well-being		N	%
Female	Medium level	7	25.0
	High level	21	75.0
Male	Medium level	44	36.1
	High level	78	63.9

The assessment of psychological well-being showed differences by gender: 75 % of women and 63.9 % of men had high levels, while 25 % of women and 36.1 % of men reported medium levels.

Table 3

Relationship between Emotional regulation and psychological well-being

Correlations				
			Emotional regulation	Psychological Well-Being
Spearman's	Emotional regulation	Correlation coefficient	1.000	.488**
Rho		Sig. (bilateral)	.	<.001
		N	150	150

The results show a significant positive correlation between emotional regulation and psychological well-being. Spearman's correlation coefficient was 0.488, indicating a moderate relationship between the two variables. This suggests that as emotional regulation improves, it also tends to improve participants' psychological well-being.

Table 4

Group Comparison

Ranges				
	Gender	N	Average Range	Sum of ranks
Emotional regulation	Female	28	89.89	2517.00
	Male	122	72.20	8808.00
	Total	150		
Psychological Well-Being	Female	28	82.25	2303.00
	Male	122	73.95	902.00
	Total	150		

Group Comparison

	Emotional regulation	Psychological Well-Being
U de Mann-Whitney	1305.000	1519.000
W for Wilcoxon	8808.000	9022.000
Z	-2.245	-1.111
Sig. asin. (bilateral)	.025	.267

a. Grouping variable: Gender

In the analysis of the emotional regulation ranges, it was observed that women (N = 28) presented an average range of 89.89, with a sum of ranges of 2517.00, indicating better emotional

regulation compared to men. On the other hand, men (N = 122) showed an average range of 72.20 and a sum of ranges of 8808.00.

The results of the Mann-Whitney test (U = 1305.000) revealed a statistically significant difference between men and women in this regard, with a Z-value of -2.245 and a bilateral significance of 0.025. This suggests that women exhibit better emotional regulation compared to men in this sample.

Regarding psychological well-being, women (N = 28) achieved an average range of 82.25 and a sum of ranges of 2303.00, while men (N = 122) had an average range of 73.95 and a sum of ranges of 9022.00. Although women had a higher average range, the results of the Mann-Whitney test (U = 1519.000) and the Z value of -1.111 did not show a statistically significant difference (p = 0.267). This indicates that, although women report slightly higher psychological well-being, this difference is not significant enough to be considered relevant in the context of the sample studied.

Table 5

Contingency table: dimensions of Emotional regulation and dimensions of psychological well-being

Variable	N	X ²	gl	p	Monte Carlo significance (bilateral)	Phi	V for Cramer	Fisher-Halton Exact Test
Self-acceptance								
* Cognitive reassessment	150	23.832	4	<.001	<.001	.539	.381	<.001
Self-acceptance *								
Emotional suppression	150	46.584	4	<.001	<.001	.557	.394	<.001
Positive relationships *								
Cognitive reappraisal	150	4.873	4	.301	.298	.244	.172	.420
Positive relationships *								
Emotional suppression	150	5.781	4	.216	.224	.196	.139	.221

Variable	N	X ²	gl	p	Monte Carlo significance (bilateral)	Phi	V for Cramer	Fisher- Freeman- Halton Exact Test
<hr/>								
Autonomy *								
Cognitive reassessment	150	.530	2	.767	.813	.080	.080	.813
<hr/>								
Autonomy *								
Emotional suppression	150	13.739	2	.001	.001	.381	.269	<.001
<hr/>								
Mastery of the environment *								
Cognitive reassessment	150	17.511	4	.002	.002	.462	.327	.005
<hr/>								
Mastery of the environment *								
Emotional suppression	150	21.766	4	<.001	<.001	.381	.269	<.001
<hr/>								
Purpose in life *								
Cognitive reassessment	150	16.464	4	.002	.003	.448	.317	.004
<hr/>								
Purpose in life *								
Emotional suppression	150	24.639	4	<.001	<.001	.381	.269	<.001
<hr/>								

The findings show significant associations between several dimensions of psychological well-being and emotional regulation strategies in operational firefighters. The relationship between self-acceptance and cognitive reappraisal strategies ($\chi^2 = 23.832$, $p < 0.001$, $\Phi = 0.539$) and emotional suppression ($\chi^2 = 46.584$, $p < 0.001$, $\Phi = 0.557$) stands out, indicating moderate to strong associations.

Significant relationships were also observed between mastery of the environment and cognitive reappraisal ($\chi^2 = 17.511$, $p = 0.002$, $\Phi = 0.462$) and emotional suppression ($\chi^2 = 21.766$, $p < 0.001$, $\Phi = 0.381$), as well as between purpose in life and both emotional regulation strategies.

In contrast, positive relationships did not show significant associations with the strategies evaluated. These results underscore the impact of emotional regulation, especially on the dimensions of self-acceptance, mastery of the environment, and purpose in life, within the psychological well-being of operational firefighters.

DISCUSSION

The firefighter profession is known for its high physical and emotional demands, as it involves regularly facing situations of danger, emergency, and trauma. These working conditions expose firefighters to significant stress, which can negatively impact their psychological well-being. In this context, emotional regulation, understood as the ability to manage emotions effectively, plays a crucial role in the preservation of mental health.

With respect to emotional regulation, the results show significant differences in the levels of emotional regulation between men and women. Women showed a higher prevalence of a medium level of emotional regulation (67.9 %), while men tended to concentrate on the low level (55.7 %).

These findings are partially aligned with previous research, such as that of (Morales Galán, 2023), who highlights that women tend to use a greater diversity of emotional regulation strategies and apply them with greater flexibility compared to men. This could suggest that the observed differences not only reflect a trend toward greater mastery in emotional regulation by women, but also better emotional adaptability.

The work of López Madrigal, Pérez Rodríguez, and García Fernández (2021) highlights that women tend to use emotional strategies, while men prefer practical solutions. This could explain the higher concentration of men with low emotional regulation in the sample, as direct solutions are not always effective for complex emotional challenges. In addition, it suggests that gender differences in emotional regulation are not clear, as factors such as age and cultural context also play a role, making these differences more complex (González Celis, Pérez Olvera, & Mendoza Madrigal, 2024)

Regarding Psychological Well-being, the results obtained in this study indicate that both men and women have high levels of psychological well-being, with a higher concentration of women at the highest levels; consistent with the findings of (González Celis, Pérez Olvera, & Mendoza Madrigal, 2024) that indicate a higher proportion of women at high levels of psychological well-being, highlighting the consistency of the results between different population groups.

Another study, conducted in the field of firefighters, also showed that women in this professional group report higher levels of psychological well-being than their male colleagues, coinciding with what was observed in this sample. This suggests that, in various professions and contexts, women may experience greater emotional stability or satisfaction compared to men (Jhonson & Smith, 2022).

However, despite these overlapping findings, a recent study examining differences in psychological well-being in workers in contexts of high exposure to stress and adversity revealed that, under certain working conditions, men have a better perception of their well-being, which contrasts with the results obtained in this research. This study shows that gender differences in psychological well-being are not universal and may be influenced by specific contextual and occupational factors (Zhou & Liu, 2020).

These studies highlight the complexity of gender differences in psychological well-being and the need to consider additional factors, such as the cultural context, professional characteristics, and personal circumstances of individuals, to better understand these dynamics and design more effective interventions tailored to the needs of (Bracco Bruce & Ruiz-Bravo López, 2017).

In this context, the present study set out to determine the relationship between emotional regulation and psychological well-being in a sample of firefighters, with the aim of identifying how different emotional strategies affect their perception of well-being. The results obtained, based on a Spearman's Rho correlation coefficient of 0.488 ($p < 0.001$), suggest a moderate and positive relationship between both variables.

These findings are consistent with those of Han, Kim, & Lee. (2024), who reported that deep acting, a more authentic emotional regulation strategy, correlates positively with psychological well-being ($r = 0.17$, $p < 0.001$). In contrast, superficial performance, associated with emotion simulation, showed a negative correlation ($r = -0.50$, $p < 0.001$), highlighting the risks of less adaptive strategies.

By comparison, studies such as that of Shuquan Chen, Cai, Omari, & Sanghvi. (2024), in rescue workers they found a lower correlation ($r = 0.30$, $p < 0.01$), possibly due to contextual and cultural differences. These variations highlight the need to consider specific factors when assessing the relationship between emotional regulation and psychological well-being.

In this sense, a comparison between the genders was also carried out to assess possible differences in the emotional regulation and psychological well-being of firefighters. This study shows that women have better emotional regulation than men, with a statistically significant difference ($U = 1305.000$, $Z = -2.245$, $p = 0.025$), which is consistent with recent research indicating that women more frequently employ strategies such as cognitive reappraisal and acceptance (Tomari, Nakamura, & Yamaguchi, 2021), who found a correlation coefficient of 0.47 ($p < 0.01$).

This is consistent with the findings of Schmidt, McCabe, & Blanchard. (2020), who suggested that women have a greater repertoire of emotional regulation strategies, which can protect them against chronic stress, with correlation values of 0.43 ($p < 0.01$).

Regarding psychological well-being, although women reported slightly higher well-being, this difference was not statistically significant, as reflected in the results of the Mann-

Whitney test ($U = 1519.000$, $Z = -1.111$, $p = 0.267$). This is consistent with previous studies that found no clear differences between genders in workers exposed to work-related stress (Yilmaz Kogar & Gok Uslu, 2021), who reported a value of $p = 0.28$. These results suggest that psychological well-being could depend on additional factors such as social support and coping strategies, beyond gender.

However, studies such as Igra's, et.al. (2023), show that men, in some high-demand contexts, may experience higher levels of well-being due to their ability to use emotional avoidance strategies, with a correlation coefficient of -0.30 ($p < 0.05$). Padhy, Chelli, & Padiri. (2015), also highlight that men can handle stressful situations better due to their tendency to become emotionally desensitized, with a correlation of 0.25 ($p < 0.05$), which could counteract some differences in emotional regulation and well-being between genders.

Although women have better emotional regulation, the differences in psychological well-being were not significant, indicating that factors such as work context and individual characteristics can influence the mental health of firefighters beyond gender.

The results show significant associations between self-acceptance, mastery of the environment, and purpose in life with emotional regulation strategies, such as cognitive reappraisal and emotional suppression. These findings coincide with Carbone (2023), who indicated that cognitive reappraisal improves self-acceptance and facilitates the fulfillment of meaningful goals, promoting well-being. Similarly, Ryff and Singer (2008) noted that environment mastery is linked to adaptive emotional regulation strategies, supporting current findings.

However, the results related to positive relationships differ from those observed by Martínez Priego et al. (2024), who found a significant correlation between positive relationships and cognitive reappraisal in rescue personnel. This study argues that emotional regulation strategies directly impact the quality of interpersonal interactions, strengthening social bonds. The lack of significant association in the present study could be due to contextual or cultural differences in the group dynamics of the firefighters evaluated.

In summary, the results emphasize the importance of emotional regulation strategies in psychological well-being, especially in individual dimensions such as self-acceptance and purpose in life. On the other hand, the observed discrepancies in the positive relationships suggest the need for future research that addresses these factors in different occupational settings, contributing to the development of more effective interventions to optimize the overall well-being of operational firefighters.

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